

Bellwork: 2/21/13

Divide using synthetic division:

$(x^3 + 7x^2 - 38x - 240)$ divided by $(x + 5)$

$$\begin{array}{r|rrrr} -5 & 1 & 7 & -38 & -240 \\ & + & -5 & -10 & 240 \\ \hline & 1 & 2 & -48 & 0 \end{array}$$

$x^2 + 2x - 48$

$(x + 5)(x + 8)(x - 6)$

Page 1

25) $x^2 + 3 \div \text{by } x - 1$

$$\begin{array}{r|rr} 1 & 1 & 0 & 3 \\ & + & 1 & 1 \\ \hline & 1 & 1 & 4 \end{array}$$

$x + 1 \text{ R } 4$

Page 2

Section 5.4 - Synthetic Division - part 2

Synthetic Division is most useful when trying to find factors of a polynomial.

- 1) Determine whether each binomial is a factor of $x^3 + x^2 - 16x - 16$

no remainder

a) $x+2$

$$\begin{array}{r|rrrr} -2 & 1 & 1 & -16 & -16 \\ & +\downarrow & -2 & 2 & 28 \\ \hline & 1 & -1 & -14 & 12 \end{array}$$

NO, $x+2$ is not a factor.

b) $x-4$

$$\begin{array}{r|rrrr} 4 & 1 & 1 & -16 & -16 \\ & +\downarrow & 4 & 20 & 16 \\ \hline & 1 & 5 & 4 & 0 \end{array}$$

yes, $x-4$ is a factor.

$$x^2 + 5x + 4 = (x-4)(x+4)(x+1)$$

Page 3

- 2) Determine whether each binomial is a factor of $x^3 + 4x^2 + x - 6$

a) $x+3$

$$\begin{array}{r|rrrr} -3 & 1 & 4 & 1 & -6 \\ & +\downarrow & -3 & 3 & 6 \\ \hline & 1 & 1 & -2 & 0 \end{array}$$

$x^2 + x - 2$
yes

b) $x-3$

$$\begin{array}{r|rrrr} 3 & 1 & 4 & 1 & -6 \\ & +\downarrow & 3 & 21 & 66 \\ \hline & 1 & 7 & 22 & 60 \end{array}$$

$x^2 + 7x + 22 R 60$
no it's not a factor

Page 4

Use synthetic division and the given factor to completely factor each polynomial function.

3) $y = x^3 + 7x^2 - 38x - 240$; $(x+5)$

$$\begin{array}{r|rrrr} -5 & 1 & 7 & -38 & -240 \\ & +\downarrow & -5 & -10 & 240 \\ \hline & 1 & 2 & -48 & 0 \end{array}$$

$x^2 + 2x - 48$
 $(x+8)(x-6)$

Factors: $(x+8)(x-6)(x+5)$

Roots: $x = -8$ $x = 6$ $x = -5$

Page 5

4) $y = x^3 + 6x^2 + 11x + 6$; $(x+1)$

$$\begin{array}{r|rrrr} -1 & 1 & 6 & 11 & 6 \\ & +\downarrow & -1 & -5 & -6 \\ \hline & 1 & 5 & 6 & 0 \end{array}$$

$x^2 + 5x + 6$

Factors: $(x+3)(x+2)(x+1)$

Page 6

Factor Completely

Homework:

pg 308 #29-30 and pg 309 #49-56

is it a factor?

